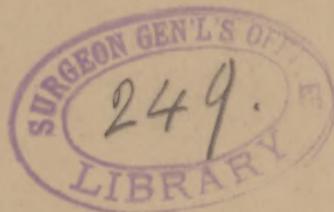


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BY *✓*
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NEW YORK.

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GONORRHEA IN THE FEMALE.*

BY ANDREW F. CURRIER, M. D.,
NEW YORK.

A PAPER with this title was published by me in the "New York Medical Journal" for January 10 and 24, 1885, in which the hope was expressed that the attention of the profession in this country might be directed to this disease, which was believed to be much more frequent in its occurrence and important in its bearings than was usually supposed, even by well-informed members of the profession.

Various reasons have been given why this disease should be practically ignored by the body of the profession, and notably by the gynaecologists, within whose field its consideration would naturally occur. The principal ones alleged are the difficulties in its diagnosis and the poor results which attend its treatment. This is a humiliating confession when Sänger's statement is considered, that more than one ninth of all gynaecological cases are now believed to be of gonorrhœal origin. It seems additionally strange, also, when one considers the great prevalence of gonorrhœa in the male, and the attention which is devoted to its nature and treatment.

I trust I may be pardoned if I draw somewhat upon the

* Read before the Medical Society of the County of New York, September 28, 1885.

paper to which I have referred; perhaps also some points in *this* paper, which may seem incomplete, will be found to be treated with greater thoroughness in the former one. The only claim which is made for this paper is that it is mainly a *r  sum  *, as faithful as possible, of the work which has been done in the investigation of this disease. The conclusions of the former paper, which subsequent experience and reflection have not induced me to modify, were:

1. Gonorrhœa in the female deserves more thorough investigation than it has yet received, especially in the light of recently established facts.
2. The diagnosis of the disease, with improved methods of investigation, chief among which are Sims's speculum and the microscope, is not so difficult as has hitherto been considered, even in the absence of direct information of actual exposure to gonorrhœal infection.
3. There is a difference between the characteristic discharge of true gonorrhœa, both as to its nature and its effects, and other mucoid discharges from the female genital tract. As a corollary to the foregoing statements, while investigators differ as to the significance of the microcococcus of gonorrhœa, its constant presence in the discharges is not denied.
4. Gonorrhœa in the female is identical with gonorrhœa in the male; the fact of individual peculiarities and susceptibilities is not questioned.
5. A series of careful investigations in well-defined cases, in a hospital or other place in which the changes and developments can be accurately noted, is desirable. No line of treatment can be recommended as unfailing and entirely satisfactory until the results of such investigations are known.

No important contribution to this subject has been made

in American literature, in so far as I can ascertain, with the exception of Dr. Noeggerath's notable paper, which was read before the American Gynaecological Society in 1876, having been previously published at Bonn, in the German language, in 1872. It is but just to say that Dr. Noeggerath's views inaugurated an epoch in the history of this disease. They were received with great incredulity by the profession here and abroad. Their suggestiveness has borne fruit, however, in the experiments and observations of a number of careful workers, and some of those who were most outspoken in their disagreement with those views now give a more or less positive assent to them. Martineau and a few other French writers have recently described certain rare forms of the disease, but the most important recent contributions have been made within the past year in Germany by Bumm, Sänger, and Oppenheimer.

I.—In regard to the ætiology of the disease, while the evidence is not absolutely complete, even those who are skeptical will admit that the probabilities are altogether in favor of a parasitic origin. Such an origin was maintained by Neisser in 1879, after an elaborate series of investigations. Neisser was not the first, however, to assert such an origin, since Donné, in 1844, discovered a spore in urethral discharges which he named *Trichomonas vaginalis*.

Salisbury, in 1868, discovered *Crypta gonorrhœica*; Jousseaume, in 1872, discovered *Algæ génitale*, and Hallier in the same year (1872) *Konotecium gonorrhœicum*. All these were forerunners of Neisser's gonococcus, but the latter was presented to the public at a time when the germ theory had captivated the minds of all men, and was therefore received with much more favor and sympathy than its predecessors. Bumm asserts ("Arch. f. Gyn.," xxiii, 3), as the result of extensive experiment, not only that the contagious property of this disease is located in the gonococcus,

but that this microbe is distinguished from all others which are contained in the discharges from the genital tract by its faculty of penetrating living tissues and its manner of multiplication. Widmark has also shown ("Svenska läkares-ällsk. Förh.", S. 159, 199, and "Jahrb. f. Kinderh.", xxiii, 1 and 2, p. 209) that in gonorrhœal conjunctivitis in adults the gonococci show the same tendency to penetrate below the epithelium of the cornea and into the lymphoid tissue which Bumm has observed in the tissues of the genital tract. In the cornea of the new-born infant, on the other hand, the lymphoid tissue is absent, and the gonococci are found upon the epithelium. The form and size of the gonococcus are stated by Bumm to be differential characters which are of minor importance, and these statements must be borne clearly in mind in examining the opinions of those who do not agree with Neisser and his followers as to the infective character of the gonococcus. The identity of this disease with the ophthalmic-blennorrhœa of new-born infants has been shown by Sattler, Haab, and other competent ophthalmologists, the distinction between it and ordinary purulent catarrh of the eyes in new-born infants consisting in the absence of gonococci in the latter and their constant presence in the former, from inoculation with gonorrhœal virus. (See Haab, "Rev. gén. d'ophthal.", June 30, 1885, p. 265.)

Of gynaecological investigators in this field, Kröner stated that, of ninety-two cases of ophthalmic-blennorrhœa neonatorum which he had seen, the gonococcus was found in sixty-three. (See "Am. Jour. of Obst.", February, 1885, p. 197.) He also examined the vaginal secretions of twenty-one mothers in the eyes of whose infants gonococci had been found, and of eighteen mothers in the eyes of whose infants no gonococci had been found. In the former group gonococci were found in all cases, and usually without the

presence of any other bacteria. In the latter the characteristic hives of gonococci were absent, though diplococci were found. Nothing satisfactory could be obtained from the mothers in these cases respecting gonorrhœal infection, and the presence or absence of gonococci was taken as sufficient evidence for the basis of a diagnosis. Oppenheimer examined the secretions from the upper portion of the vagina which were taken from one hundred and eight pregnant women at the Heidelberg Obstetric Clinic, between January and September, 1883, and found gonococci in thirty of them (*Untersuchungen über den Gonococcus*, "Arch. f. Gyn.", xxv, 1, p. 51).

He also made some investigations upon the subject of *ophthalmo-blennorrhœa neonatorum*, and found that it usually occurred within five days from birth, or about the usual incubation period of gonorrhœa, and that it was most frequent in those cases in which parturition had been tedious, notably in so-called *dry* births.

In cases in which blennorrhœa or corneal ulceration was present at birth, the supposition was advanced that the bacteria might have penetrated the foetal envelopes and infected the *fœtus in utero*. As evidence of another character, Zweifel had the hardihood to inoculate the eyes of healthy infants with lochial secretions in which no gonococci could be found; no blennorrhœa resulted ("Arch. f. Gyn.", xxiii, 1883). Kroner also inoculated the conjunctivæ of five blind persons with secretions from the vagina of a pregnant woman in which no gonococci were found, no bad results following. In the case of another blind person the eyes were inoculated with muco-purulent matter from the vagina of a mother whose infant was suffering from simple purulent conjunctivitis, likewise with a negative result ("Am. Jour. of Obst.", February, 1885, p. 197). Important testimony as to the infective character of the gonococcus also resulted

from some recent experiments of Welander ("Gaz. méd. de Paris," June 7, 1884, p. 267).

This investigator found gonococci in the purulent urethral secretions of seventy-nine women. In twenty-five of them he traced the source of the contagion, and discovered gonococci in the urethral discharges of each of the twenty-five men. Vaginal secretions which contained no gonococci gave negative results when used for inoculation purposes. This experiment was tried in three cases. In one the secretion was taken from the vagina of a woman who was menstruating at the time of the experiment. From the urethra of the same woman matter containing gonococci was also removed and applied to the healthy urethra of a man. At the end of two days this man began to suffer with an urethral discharge, in which cocci were discoverable upon the epithelial cells. On the following day there was a characteristic gonorrhœal discharge which contained an abundance of gonococci. Similar results followed inoculation with matter from the infective urethral discharges of the two other women.

Koch demands the satisfaction of three conditions in proving that a given infectious disease is caused by a given micro-organism :

1. That one and the same form of spore be always found in a given disease.
2. That the same be easily recognized, morphologically or by its chemical relations, as well as by its behavior to coloring materials.
3. That the disease may be artificially produced in a healthy individual by inoculation with pure cultivations of spores.

These requirements, says Oppenheimer ("Arch. f. Gyn.," xxy, 1, p. 51), are all fulfilled by Neisser's gonococcus in its relations to gonorrhœa. Pure cultivations have been obtained to the fourteenth generation, and, although the dis-

ease could not be induced (Oppenheimer, *loc. cit.*) in dogs, cats, puppies, and mice, it has been in the human subject by Bokai, Bockhardt, and Welander.*

Further testimony as to the infectious nature of the gonococcus is at hand, if it were required, from a number of observers who have treated the question experimentally. (See Leistikow, "Charité Annalen," 1882; Königstein, "Arch. f. Kinderh.," 1882; Arning, "Vierteljahresschrift für Dermatologie," 1883; O. Haab, "Festschrift für Horner," 1880.) Among those who are still skeptical or incredulous with regard to the pathogenic powers of the gonococcus, mention may again be made (as in my former paper) of Sternberg. He maintains that the gonococcus is not morphologically distinct from all other bacteria ("Med. News," Philadelphia, xlv, 1884, p. 426), an identical one being found in normal human saliva, in pustules resulting from contact with the cadaver, and in the pus from acute abscesses; but he very properly adds that it is not essential for the gonococcus to have distinguishing morphological characteristics to establish its position as the cause of the infective virulence of gonorrhœal pus. This is simply in accord with what has already been quoted from Bumm's statements, and is also in line with Koch's cholera investigations, at least three bacilli having been discovered which present morphological peculiarities resembling those of the comma bacillus. In following these investigations, Sternberg and two other gentlemen applied to their own urethræ, August 23, 1884, cultivations of gonococci of the ninth generation, taking all necessary precautions that the microbes should not be disturbed. The results were negative, and these, with other similar unsuccessful experiments, tended to establish Stern-

* Stub reports that the gonococcus *will* produce a condition which closely resembles gonorrhœa, in all its details, in dogs and rabbits. "N. Y. Med. Jour.," May 23, 1885.

berg's skepticism as to the infective properties of the gonococcus. He declares, however, with perfect frankness, that, notwithstanding his own failures, the experiments of Bockhardt and Welander, which I have quoted (See "Nord. med. Ark.," Stockholm, 1884, xvi, No. 2), together with evidence relating to other infectious diseases, warrant belief in the possibility that virulence does depend upon the presence of this micrococcus, which is a widely-distributed and usually harmless organism, but which may acquire specific pathogenic power, as a result of special conditions relating to its environment, which pathogenic power may be lost, he thinks, when these conditions are removed. This line of reasoning on the part of an expert and conscientious investigator seems, to my mind, a virtual admission of the special infective power of the gonococcus, especially when we bear in mind that there is no more inconstant quantity than the physical condition and susceptibilities of a given tissue of the body. Therefore the negative results of inoculation with the gonococcus, in any number of cases, need not outweigh positive testimony in a single case, if all the conditions are reliable. The immunity from contagious diseases in general which seems to be peculiar to some individuals is certainly no argument against the general theory of susceptibility to such diseases.

De Amicis professes ("France méd.," Paris, 1884, ii, p. 1095) to have produced blennorrhagia with injections of ammonia, and to have found micrococci and diplococci on the sixth day which he could not differentiate from those which were obtained in cases of urethritis with a clear history of contagion. He affirms that diplococci are to be differentiated from micrococci which are found apart from the genital passages only by their size, distribution, and mode of grouping. Bunn and Widmark have been quoted as insisting upon a more important distinction than this, namely,

the property of penetrating living tissues. Neither De Amicis nor Sternberg has made any comment upon this characteristic. De Amicis agrees with Sternberg that the gonococcus may possibly have pathogenic properties under certain conditions, in which the mucous secretions act as cultivation-fluids. At such times the microbes develop with great activity, and may then possess an exceptional though not an original infective power. In legal medicine it was thought that the presence of gonococci could not be taken as a necessary evidence of venereal disease of inflammatory origin. Welander, whose important experiments have been quoted, concludes that there is a practical importance in the presence of these organisms, especially as a means of deciding upon the existence of infectiousness in prostitutes and others, which would certainly give them a value in a medico-legal sense.

Thus we have the arguments *pro* and *con* with regard to the infectious character of the gonococcus, and it appears that no one who has experimentally investigated the subject and whose work is accessible to the public ventures to give more than a modified dissent to the statements which were made by Neisser. That the microbe, at least in so far as morphological peculiarities are concerned, is not limited to the genital organs, or even to the eyes, is probable. Neither must it be overlooked that von Tischendorf professes to have found gonococci in the vaginal discharges of little girls suffering from scarlet fever, in which an origin by sexual contact was excluded, and in which, also, inoculation produced similar conditions in other children ("Am. Jour. of Obst.," Feb., 1885, p. 199), but, in this case also, there is no indication that the distinctive characteristic which was mentioned by Bumm was present. Little remains to be said regarding the aetiology of the disease. A history of recent impure sexual contact, in the presence of certain well-known

clinical features, with or without an examination for gonococci with the microscope, will usually be accepted as sufficient evidence of gonorrhœa. The search for these microbes is always difficult, and often unavailing when only a few are present. That we are to depend mainly upon the clinical features for a diagnosis is agreed by Sänger, Fränkel, Kroner, and Noeggerath. This is especially true in many of the cases of latent gonorrhœa concerning which the skepticism of earlier days is passing away. The conversion of Fritsch, who was once one of the most pronounced opponents of Noeggerath's views, is an evidence of this.

II.—Certain forms of this disease are much better known and much more readily recognized than others. With many physicians gonorrhœa in the female is synonymous with elytritis, and it will be readily conceded that this is by far the most common form, though not always the one which is most susceptible of successful treatment. I may here repeat the statement which I made in my first paper, that the loose tissue in the posterior vaginal fornix is very commonly a source of trouble when all other portions of the mucous membrane have been cured. This area can only be exposed by the use of Sims's speculum, or some similar instrument, with a good light either direct or reflected. The mucous membrane of the cervical canal may be involved as a primary or a secondary condition, and its rich glandular structure furnishes abundant opportunity for the accumulation of infectious material, to be propagated thence beyond the os internum. In many cases, however, it is limited by the os internum, and is wholly or in part eradicated by the use of suitable means. Less frequently the urethra and bladder are affected, this being especially true of the bladder. The anatomical relations of the meatus and urethra explain the infrequency of the disease, as a

primary condition, in these parts in women. The discharges of the urethra in such cases abound with gonococci, and Welander, Belleli, and others have made observations upon this subject, Belleli having obtained specimens from a large number of prostitutes at the *bureau de visite* in Alexandria, Egypt (see "Unione med. egiziana," Nov. 1, 1884). An extension from the bladder to the ureters and kidneys is a possibility, and has been referred to by Sänger, but he mentions no cases which he has seen or heard of. The condition must be one of great rarity. The vulvar glands with their ducts and circum-glandular tissue, the rectum, and the skin around the external genitals, may all, or any of them, be the seat of the phenomena of this disease; likewise the mucous membrane of the body of the uterus and of the Fallopian tubes. That an extension of the process, by way of the Fallopian tubes, to the ovaries, the parametrium, and the general peritonæum may occur, and cause fatal peritonitis, is not only a possibility, but a fact which has been observed from a period at least as remote as 1846, when Mercier published the results of his investigations in the dead-house ("Gaz. des hôp.," 1846, p. 432). In fact, Sänger states (*loc. cit.*) that this disease is the cause of a larger percentage of grave chronic abdominal diseases than puerperal fever or syphilis. The weighty evidence of Lawson Tait as to its gravity is also given as a result of his extensive experience (see "N. Y. Med. Jour.," 1884, p. 421). Thus the profession is approaching the views that Noeggerath enunciated in 1872, which, as he prophesied, have borne fruit with the years.

A form of the disease which, until recently, was overlooked, is that which involves the peri-urethral or pre-urethral glands, and upon which papers have been written by Martineau ("Bull. et mém. de la soc. de thérap.," Paris, 1884, 2 s., xiv, 81), by his pupil Guedeney (Inaug. Thesis,

“Contrib. à l'étude de la blennorrhagie chez la femme,” Paris, 1883), by A. Guérin, under the name of external blennorrhagic urethritis, by Hamonic (“Ann. de dermat. et de syphil.,” August 25, 1883), and by Skene in the course of a lecture upon “Vaginitis and Vulvitis” (“Med. News,” Philadelphia, 1884, xliv, p. 29). The glands or follicles, which are most often the seat of this trouble, were described in 1864 by A. Guérin, and correspond to the ancient descriptions of a body which is supposed to be the analogue of the prostate. They surround, or partly surround, the urethra near the meatus, sometimes being joined in the median line, at others being separated by a bridge of tissue. Their ducts pass upward within the vestibule and open on either side of, and just under, the clitoris. The inflammation which affects them may be acute, or it may be exceedingly chronic, persisting long after all apparent symptoms have disappeared. Martineau says (*loc. cit.*) he has repeatedly found gonococci in the discharges which he has obtained from these chronic cases. If, therefore, infectious power resides in the gonococcus, we can readily see how a woman who thinks herself cured may be suffering from latent gonorrhœa, and prove unintentionally and unknowingly a source of infection. This also explains the statement of Ricord, that a woman may communicate gonorrhœa when she does not possess it herself, which was doubtless as much of an enigma to him as his statement was illogical and absurd. Allusion has already been made to a variety of this disease to which I wish to call especial attention, because it is one of the gravest varieties, and has received considerable attention within the past year or two, notably at the hands of Lawson Tait. It is that variety which affects the Fallopian tubes. The pathology of these organs has been sufficiently investigated to inform us that, in addition to simple catarrh, hydrosalpinx, and haematosalpinx,

there are other more serious conditions which, according to Sänger (*loc. cit.*), are usually of an infectious nature, and are either tubercular, syphilitic, actinomycotic, or gonorrhœal in character. Of these the gonorrhœal form is the most frequent. It is usually met with as pyosalpinx, but the latter is not necessarily of gonorrhœal origin. The diagnosis rests upon the discovery of gonococci. If these are found in the discharges from the genital passages, and tubal disease is evident, removal of these organs will probably reveal the organisms in the secretions which they contain, or in the mucous membrane itself. The diagnosis of tubal disease by palpation is, however, a matter of extreme difficulty, in which very few men have ever attained expertness. Even Lawson Tait says he is mistaken once in every five cases ("N. Y. Med. Jour.", 1884, p. 421). In the light of such testimony too much caution can not be observed in pronouncing opinions respecting such conditions. Autopsies upon the bodies of prostitutes have frequently revealed an inflamed, dilated, and dislocated condition of the tubes, which is at least suggestive of gonorrhœal disease, an opinion which is shared by Sänger and Tait. Finally, Sänger has described a form of this disease which he calls puerpero-gonorrhœal salpingitis, which may be excited in a recently delivered woman by a latent or acute gonorrhœa of her husband. Such a distinction seems quite superfluous, as it does not appear that the phenomena differ from those which are manifested in other women. The influence which gonorrhœa exerts upon fecundity was elaborately expressed by Noeggerath in the paper to which allusion has been so frequently made. In a great many cases sterility is unquestionably the result. In prostitutes especially it is fair to presume that the infrequent pregnancies are influenced by this cause. Should gonorrhœa supervene after pregnancy has been established, I have never seen that it

exerted an influence upon the mother severe enough to produce a miscarriage, nor upon the fœtus any that was analogous to that of syphilis. In cases of congenital *ophthalmia neonatorum* the theory has been advanced that the gonococci traversed the fœtal envelopes and the amniotic fluid and penetrated the fœtal conjunctiva. But why such a process of selection should be followed, the eyes being chosen instead of the urethra, or some other opening which is lined with mucous membrane, does not appear. It is also probable that the eyelids are always closed *in utero*, though this might not prove an efficient barrier to the penetration of the microbes.

III.—In discussing the question of treatment, attention must be given to the value of a wise and judicious prophylaxis. Especially should prostitutes—that large class of individuals which society tolerates at such an enormous cost to itself in every way—receive attention of this character. Leaving the moral aspect of the question out of consideration for the present, although this ought to be sufficient to arouse the sympathy of any one who has the welfare of his fellow-beings at heart, it is perfectly clear that any class of individuals which distributes infectious disease in the community should be under police regulations. It matters not what the disease is, so long as it is a source of danger to the community. The reply to this may be that there is a distinction between infectious diseases which one avoids and those which one dares or defies, of which small-pox will serve as the type of one and gonorrhœa of the other. My rejoinder is that the community—the Government, State and municipal—either tolerates prostitution by taking no steps to suppress it, or it licenses it; and therefore it ought to protect the citizen from the infectious diseases which it entails. I confess that I have no elaborate scheme to offer for the accomplishment of this great end, but the remedy

lies in the direction of a properly systematized medical police, with suitable hospitals or stations properly equipped; and this will come when public opinion is aroused to the necessities of the situation through the enlightened instruction of the medical profession.

Injections of sublimate, carbolic acid, iodized alcohol, dilute nitric acid, nitrate of silver, and other germicides have been recommended as prophylactic means, both for prostitutes and those who consort with them; but any one who has had experience with these classes will readily realize that this plan simply places dangerous remedies in the hands of individuals who are usually either reckless or ignorant in their use of them. Another important point in connection with the subject of prophylaxis has reference to the consummation of marriage on the part of women who are suffering, or have suffered, from gonorrhœa, and such women are by no means confined to the class of prostitutes, as any physician of experience is able to testify. Any one who has seen the mischief which is wrought in families by the discovery of such a condition will surely make the requirements not less stringent before giving his professional consent to marriage than if the gonorrhœa had been in the male instead of the female. As long as gonococci can be found in the discharges, that consent should be unhesitatingly withheld. The pathogenic nature of the micrococcus being admitted, the treatment will naturally be directed chiefly at its vitality. Whatever theory be adopted as to the nature of the disease, those agents must be used which will stop the offensive discharges, relieve congestion, and produce a healthy tone of the affected tissues with their vessels and nerves. Oppenheimer has made a large series of experiments bearing upon this subject, which are both interesting and important (*loc. cit.*). He first tried to cultivate gonococci by using fresh gonorrhœal pus from a

patient in the acute stage of the disease who had not yet been treated. The pus was mixed with one part urine gelatin, two parts water, and three per cent. of meat-peptone. This experiment was unsuccessful, but was followed by one which was successful, in which sterilized blood-serum was used as the cultivation-fluid. The microbes were developed upon pieces of thread which were laid in the serum.* No effect was produced upon their vitality by solutions of sub-nitrate of bismuth, acetate of lead, or alum. Slight effect was produced by strong solutions of sulphate of copper, zinc, or iron, and chloride of zinc. Development was arrested by a two-per-cent. solution of nitrate of silver.†

Of the mercurials, a solution of 1 to 15,000 of the nitrate or sulphate retarded development, 1 to 10,000 destroyed vitality; 1 to 40,000 of sublimate retarded development, 1 to 20,000 destroyed vitality. Solutions of mercurial salts in glycerin were equally effective with watery solutions. Chlorate of potassium or of sodium in solution was ineffective, the former being used to the limit of saturation. Permanganate of potassium was destructive in 1-to-25 solutions; in 1-to-50 solutions it retarded development; it was entirely inert in the weak solutions which have been recommended by Zeissl. Moderately strong solutions of bromine, chlorine, and iodine destroyed the microbes, while methyllic and ethylic alcohol, sulphuric ether, glycerin, and chloroform were effective only when used undiluted. Tannin and resorcin were inert. Five-per-cent. solu-

* The vitality of the microbes was seen in the fact that they survived the drying of the cultivation-fluid, and this fact may be of importance in explaining some obscure cases of infection in which all necessary precautions are supposed to have been taken.

† This is the solution which was recommended by Credé a few years ago as a prophylactic against *ophthalmia neonatorum*, and has come into very general use for this purpose.

tions of carbolic acid destroyed life in ten minutes; one-per-cent. solutions only retarded development. Watery solutions of thymol and salicylic acid of sufficient strength to excite inflammation in normal tissues did not kill the organisms, while alcoholic solutions of the same strength were efficient. This is the more remarkable since alcohol alone was not destructive. Fifty-per-cent. solutions of creasote were rapidly fatal. Turpentine was quite effective; balsam of copaiba and cubeb extract were harmless. It was thought possible that the well-known efficiency of cubeb and copaiba in the practical treatment of gonorrhœa might be due to chemical changes which the drugs underwent in the system. This matter was tested by using specimens of urine drawn from the bladder of a pregnant woman through a heated metallic catheter. The urine was normal in character and had no influence upon gonococci. Two doses of copaiba balsam were then given to the patient, of fifteen grains each, and with an interval of three hours between them. The urine was then drawn with the precautions mentioned, and was found to contain conversion products (*Umsetzungsprodukte*) of the balsam. Threads upon which cocci had been developed were immersed in this, and allowed to remain eighteen hours. At the end of that time they were transferred to a cultivation-fluid, but no development occurred. The same result followed experiments with cubeb. The supposition is therefore warrantable that these substances undergo chemical change, and, after elimination by the kidneys, perform their work upon the cocci in the genital tract. Oppenheim-er's conclusion is that only sublimate, creasote, and nitrate of silver are of any practical use for the destruction of gonococci, and he is entitled to a respectful hearing, for no one, apparently, has investigated this subject more exhaustively or patiently. There is a factor, however, which is not embraced in any investigation of this character—name-

ly, that of idiosyncrasy or personal peculiarity, and the mysterious changes which occur within the tissues and cavities of the body can not be exactly reproduced outside the body, because the conditions can never be exactly the same. It is, therefore, clinical rather than purely experimental results by which we must finally be guided. To illustrate, Oppenheimer found solutions of chlorate of potassium inert in their effect upon gonococci, but a gentleman of extensive experience assured me that they were quite efficient, with him, in subduing all the phenomena of gonorrhœa. Oppenheimer found resorcin inert, but Martineau (*loc. cit.*) obtained good results from its use. Rebatel recommends a weak injection (vaginal) of salicylic and citric acids, or of a decoction of lemon, for their efficiency in the gonorrhœa of females, which would, doubtless, have little effect upon Oppenheimer's cultivated gonococci. On the other hand, I have found, in a large number of cases, that the sublimate treatment (that is, by local applications) was quite unsatisfactory, and this experience is similar to that of Kroner, Schatz, and von Tischendorf. Oppenheimer places it at the head of the list of gonococcicides. Von Tischendorf's best results were with irrigations of acetate of aluminium and applications of iodoform. I have tried the latter many times without positive results. The best results which I have seen have been mainly from free applications of a mixture of glycerin and subnitrate of bismuth. Allow me to narrate a typical case in which the results of this treatment were quite a revelation to me :

A young unmarried woman came under my observation with gonorrhœa in an intensely acute form. The urethra was evidently involved, the mucous and submucous tissues of the vagina were inflamed and infiltrated, and there was also inflammation of the mucosa of the cervix. There was no question as to the diagnosis, as the man with whom she had cohabited was

also suffering with gonorrhœa. Applications of sublimate, eucalyptus, iodine tincture, etc., were tried for two or three weeks without success. The patient was then informed that she must give up her occupation (that of book-keeper), remain in bed for a season, and receive such treatment as seemed necessary. A mixture of subnitrate of bismuth and glycerin was at hand, and a tampon saturated with this was used empirically. Two days later the tampon was removed, and, to my surprise, the congestion and sensitiveness of the inflamed portions were greatly modified, and the offensive discharge had greatly diminished. This treatment was, therefore, continued, with applications of iodoform, every day, and after a week every other day, the tampon remaining ten or twelve hours. Vaginal douches of hot water were also very carefully given once or twice a day, after the removal of the tampon. Liquid food was taken, and an abundance of alkaline drinks. In three weeks every trace of the disease had disappeared, and the patient had resumed her occupation.

I have frequently used the subnitrate of bismuth and glycerin mixture since the experience described, and always with satisfaction. Its function consists in a free depletion of the congested tissues and a very decided astringent action. The proportion of a drachm of bismuth to an ounce of glycerin may be used, the mixture being, apparently, only a mechanical one. Such a mixture may not be directly destructive to gonococci, but, by the modifying action which it has upon the secretions, it deprives them of the qualities which are necessary to cultivation-fluids, and thus the microbes die of starvation. Whatever method of treatment is chosen, it must be carried out persistently and systematically, even to the last detail. It will not be enough to prescribe vaginal injections or uterine applications of this or that; the physician must be certain that they are used, and, if necessary, must attend to or superintend the details himself. Especially is this true in regard to those obscure

forms of the disease which affect the glands and ducts of the urethra, vulva, vestibule, and fourchette. Abscesses and fistulae may be results of the disease in these parts, and, in addition to the list of drugs for local application, it must be borne in mind that it may be necessary to use the knife or actual cautery before the disease can be overcome. Such a course has been recommended by Guedeney, Martineau, and Vidal de Cassis. If the given symptoms point to an extension of the disease to the tubes and ovaries, the question of abdominal section becomes a pertinent one. I believe that this operation is done too often. It is not sufficient that an operator can show a good percentage of recoveries after salpingo-ovariotomy; he must show positive results flowing from the removal of important organs in which, in many cases, no disease is traceable either by the naked eye or the microscope. Many plans of treatment are available before a woman should be submitted to the risks and uncertainties of a capital operation. Concerning the curability of the disease, Noeggerath's paper declared that he did not think this possible, and I have seen no statement from him to the contrary, though Neisser's doctrine was announced seven years after the first publication of that paper, and may have modified his views. Bumm believes that it may be entirely recovered from, and that it is amenable to treatment according as the area of infection is moderate in extent and near the surface. Arnaud has observed that it can be considered radically cured only when the menses have become regular and when metrorrhagia and other symptoms and complications have ceased ("L'Union méd. du Canada" [from "Abeille méd."], May, 1885, p. 223). This statement is unsatisfactory, however, for there are many cases in which neither metrorrhagia nor any irregularity of the menses occurs at any time. My own belief is that it depends upon the gonococcus for its activity; that if

the mucous membrane, with its innumerable crypts, follicles, and glandules, is treated with sufficient thoroughness by either of the efficient germicides which have been mentioned for a sufficient length of time, which will vary with the extent of tissue involved and the potency of the secretions which serve as cultivation-fluids for the gonococci—that if these conditions are fulfilled the disease can be cured, for dead organisms can not reproduce themselves. Of course, this statement has no bearing upon the question of reinfection which, so far as I know, is at any time possible.

A few days ago I saw a lady who first came to me more than two years ago with gonorrhœa, which was very obstinate and rebellious to treatment. For more than a year she was almost constantly under observation, and at the end of that period I considered her cured. Since then there have been no clinical manifestations pointing to a recurrence of the disease, therefore I see no reason why her cure should not be considered positive, and I believe the same would hold equally true in any similar case.

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